

the **McGill** daily

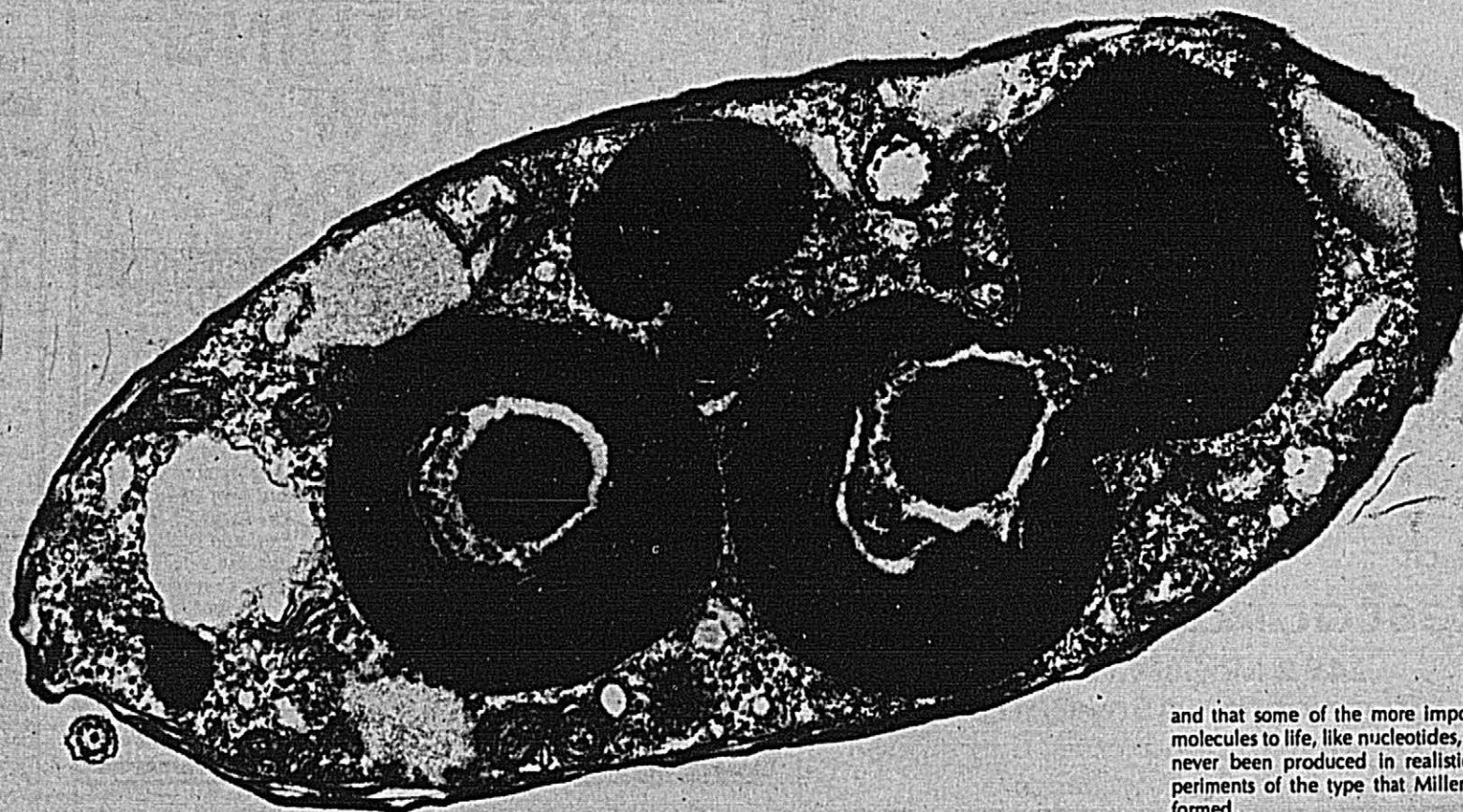
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Montréal, Québec

The origin of life



by Cameron D. Eckert

Standing on a rock in a river, I watch the water lap up onto my shoes — Looking around all is alive and it may in fact be that there is no portion of this world that remains uninhabited. At this moment I am struck by a question just as many others before me have been. The eternal question, how did all this begin — this life on earth? Great scholars and wise beings have pondered this question for thousands of years and now in 1985 new light is being shed on this question.

The original hypothesis regarding the origin of life on earth is perhaps the one with which most of us are familiar. In brief, God was to have created the earth in six days — a period of time in which the heavens, the earth, night and day,

woman, man and the rest of the beasts were created. After this monumental task He chose the seventh day on which to rest. Over the past two-thousand years this view of creation has received much support, that is, until certain individuals began to promote alternative ideas.

Most notable was Charles Darwin's theory of natural selection and the entire concept of evolution which seems incompatible with the creationists' view regarding the origin of life on earth.

In the early 1900's scientists began to seriously consider the questions regarding original beginnings. The question itself is not conceptually difficult to understand; there was a time when there must have been nothing, simply rocks, water, gasses and then something came of this. Something from nothing? It seems impossible. So where did that first something come from and what was it like biologically?

In the early 1920's the Russian biochemist, A.I. Oparin, and British biologist, J.B. Haldane put forth the hypothesis of the *Primordial Soup*.

4.5 billion years ago there was to have been a broth of basic molecules brewing in the oceans of pre-vital earth. The earth's atmosphere at that time was to have been somewhat like that of Jupiter; a milieu of unoxidized gases such as methane, ammonia and hydrogen — certainly not an environment suitable for life as we know it.

The soup was to have cooked through various energy sources that were available at the time, which may have included volcanic activity or energy in the form of electrical discharges.

Through these dramatic processes

organic molecules were to have been formed and somewhere in that brew one could find small proteinaceous spheres, the original cell capsules. Some method for the replication of these cells and some way to carry on the cellular information was needed. Single stranded RNA is thought to have answered that call.

From there it was merely a matter of basic evolution whereby the original cell was transformed into a primary producer which could begin to oxygenate the atmosphere allowing organisms to crawl out of those prehistoric oceans.

Harold Urey developed the idea of the Jupiter-like atmosphere in the 1950's and in fact one of his research students, Stan Miller, simulated the soup hypothesis in the laboratory. Miller passed sparks through a gas mixture consistent with what is thought to be on Jupiter. Water soluble organic molecules were indeed found, that is, he cooked himself a primordial soup.

Since Miller's work little has been done to question the hypothesis such that the Primordial soup hypothesis remains the only scenario for the origin of life that one is likely to hear in an introductory biology class.

After all those years of not being able to sleep at night because of worries that there are serious flaws in the old creation story, one is finally able to rest safe with the knowledge that the human race is merely a soup by-product.

But wait, there is dissent in the scientific community over this soup theory. Some have gone so far as to suggest that there was no soup at all and that an explanation of life on earth can be found in clay.

A.G. Cairns-Smith suggests that "the very first systems able to evolve through natural selection are likely to have been made differently from today's organisms, and of different materials. They may have been crystals of clay."

Cairns-Smith feels that nothing has been done since Miller's experiments to support the primordial soup hypothesis

and that some of the more important molecules to life, like nucleotides, have never been produced in realistic experiments of the type that Miller performed.

The soup hypothesis has not been questioned more vigorously because it makes logical sense with two incontrovertible facts in support. First, there is unity of biochemistry whereby most central molecules of life are the same in all organisms on the earth today. Second, at least some of these molecules can be made under the conditions that existed way back when.

Cairns-Smith opposes these two mighty facts on these grounds. Firstly one can assume that all life is descended from a common ancestor and that this ancestor was high up the evolutionary tree. The central biochemical system may have been fixed at that time when many well chosen components depended so much on each other that they could not, any of them, be changed. Hence the unity of biochemistry refers not to the original moment of life but to some later moment in evolution.

Secondly, the fact that some of our central biochemicals are easily made does not mean that the origin of the original organisms were made of them. The Clay Hypothesis sees the early organisms as 'low tech' — made of different materials which slowly evolved to become more complex. These original materials are suggested to have been geochemicals.

There still remains a critical issue in the Clay hypothesis. How does one move from clay, something that one views as basically inanimate, to a form that is living? This problem has been the subject of intense research at the National Aeronautics and Space Administration Ames Research Center, where they have found that metal ions such as zinc and copper can mediate the binding of nucleotides to clays. All that is left to do is to discover crystal genes.

So here one has three hypotheses: biblical, culinary and dirty, that attempt to account for the existence of life on our earth, each with their own particular strengths and flaws. Now I just hope that we can all sleep at night.

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inside



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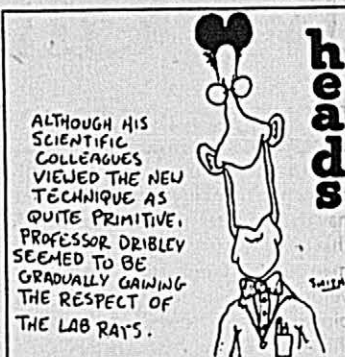
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McGill enters age of biotechnology

by Monica Vetter

Contrary to popular belief biotechnology is nothing new. Any connoisseur of beer will testify to the fact that yeast micro-organisms have served man well for hundreds of years by converting sugars to alcohol. Modern biotechnology, however, is capable of things which the 18th century brewer would never have dreamt possible.

Nature, it seems, is a wizard at designing highly sophisticated organisms which routinely carry out a whole array of complex biochemical processes in order to survive. Scientists have gradually come to the realization that some of these processes can be controlled and directed towards producing goods of use to people. Although traditional biotechnologies have been in use for quite some time, only recently has it become apparent what organisms and biomolecules are capable of under the right circumstances.

Modern biotechnology owes most of its success to recent advances in molecular biology. In the 1950's and 1960's molecular biology emerged as an academic discipline, fueled by Watson and Crick's discovery of the structure of DNA. By 1972 molecular biologists had developed techniques with which organisms could be transformed permanently by the insertion of genetic materials from other species.

Being able to delve into the inner workings of the cell has opened a whole new kettle of fish for molecular biologists. It is now possible to engineer high-yield crop strains, control livestock breeding, have bacteria synthesize large quantities of growth hormone and insulin, or extract high-grade ore in mining. The possibilities are truly endless. Biotechnologists are also beginning to use biomolecules and polymers to create products capable of interfacing with biological systems, such as artificial organs and cells.

Progress in biotechnology is necessarily dependent upon advances in many basic science disciplines such as chemistry, biochemistry, molecular biology, plant science, chemical engineering, microbiology and immunology, and medicine. McGill University has long been an established leader in many of these fields and is thus in a position to make valuable contributions to the development of biotechnology.

This fact was not lost on Gordon MacLachlan, the Dean of Graduate Studies. In 1980 he founded a Biotechnology Research Group to draw together key researchers from different areas involved in biotechnology. The group was established to advise the university on matters relating to biotechnology, and help formulate responses to public and government pressures. It was also interested in coordinating related research efforts within the university and in initiating new programs at the graduate and undergraduate level in biotechnology.

In 1984 the Canada's first chair in Biotechnology was established at McGill, supported by a special \$750,000 grant from Canadian Pacific Limited. The position is currently held by Dr. Kelvin Ogilvie, who established himself as one of McGill's foremost researchers by developing the chemistry underlying the automated synthesis of DNA molecules (the gene machine). His involvement with Bio Logicals, the first Canadian biotechnology company listed on the North American stock exchange, helped to launch Canada into the international biotechnology market.

Last year the Faculty of Science introduced a new undergraduate minor program in biotechnology on recommendation from the Biotechnology



Research Group. As Dr. Ogilvie explained, "The minor program was established in response to student interest in biotechnology. The objective

was to provide the student with a sound training in one of the established disciplines while making them aware of its practical applications."

The minor program essentially draws on existing courses from several departments related to biology, biochemistry and chemical engineering. One

500-level seminar course was introduced to expose students to a variety of topics related to research in biotechnology. As Dr. Ogilvie pointed out, "Biotechnology is a very broadly based field"; such a course allows students to "become aware of developments and opportunities in fields other than their own to see how each discipline impacts upon the others".

The response to the minor program is growing as more students become aware of the fact that it is being offered. Dr. Gordon Sinclair, the program coordinator, explained that "The conditions for completion of the minor are rather difficult, therefore students in course (i.e. U2 and U3) find it difficult to meet the requirements." Students entering the program must usually decide to do so first year, or extend their stay at McGill.

When asked whether a majors program was being considered in the future Dr. Sinclair said that such a program was really not possible, "since there is no cohesive body of knowledge that is biotechnology." Dr. Ogilvie stated that, "Most researchers felt that a majors program was unwarranted, since biotechnology arises out of fundamental developments in established areas."

As for future changes to the minor program, Dr. Ogilvie felt that the program would be examined quite closely at the end of this year. "We've had two years of experience with the program and will now have had time for adequate feedback from students." He stated, however, that any changes would probably involve "more tailoring than radical surgery."

Woodland hunter hears all

by Lorraine M. Breton

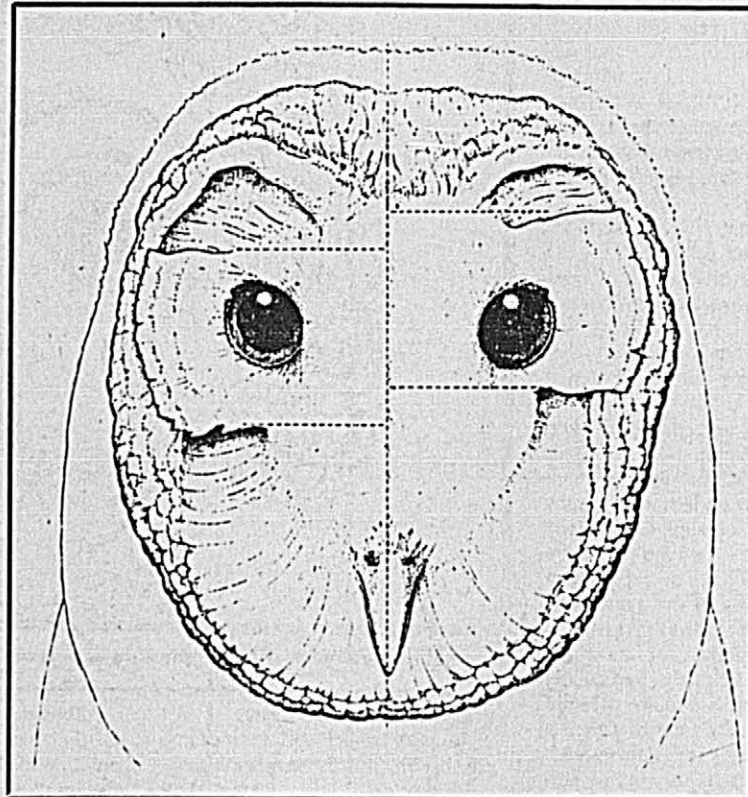
In the forest in the black of night not a sound can be heard. Out of the silent darkness a deadly raptor plunges to the ground and in a flash of fur and flesh the bird rises into the air again with a field mouse caught in its talons.

The bird just observed was a Barn Owl who stands 12 to 18 inches high, has a white face, buff-coloured back and buff-on-white breast. The Barn Owl is a nocturnal hunter and its survival depends on its ability to locate its prey quickly and precisely. Hunting from the air it must not only accurately locate its prey in horizontal space but also determine its angle of elevation with respect to the prey. The owl performs this complex task by locating the sound made by a scurrying animal.

The Barn Owl's specially adapted anatomical features allow it to locate sounds in the horizontal and vertical dimensions more accurately than most other beasts of the forest, including man.

Sounds arriving at the owl's face are collected by discs of densely packed feathers. The sound then passes through a layer of fine, acoustically transparent feathers which cover the face of the bird, and is finally brought to the ear canals by two troughs running behind the facial discs.

The ears are asymmetrically located on the owl's head, such that the right one is slightly lower and angled upward while the left is higher and angled downward. Thus, the time of arrival of sound to the two ears is staggered. Following the same principle the loudness of the sound will be different for each ear. By comparing the information gathered by both ears the owl is able to ascertain the exact horizontal location of the sound.



Facial structure of the barn owl is responsible for much of the bird's precision in hearing. Due to asymmetry of the face the left ear is more sensitive to sounds from the left and from below, while the right ear best perceives sounds from above and to the right.

Additional information is required for accurate location of the prey in all dimensions. The troughs behind the facial discs provide this needed information by amplifying the sound arriving in the ear, whereby the ear becomes

more sensitive to sounds from a given direction.

Knudsen and Konishi performed head-orientation experiments on Barn Owls and observed that, while the bird's eyes remain immobile, upon

hearing a sound it rapidly shifted its head to a position which allowed most accurate auditory and visual perception of 'prey'. Further to this they found that the bird can accurately locate the source of sound even when that sound has ended before the bird is able to turn its head.

From this finding they suggested that head movement is a response triggered by auditory neurons which perceive horizontal and vertical location of sound. These neurons only accurately locate sounds with high frequencies (3000 to 9000 hz).

A further extension of this research involved plugging one of the bird's ears which resulted in gross errors in judgement. This showed that both ears are necessary for good hunting skill.

Knudsen and Konishi then performed experiments on anesthetized Barn Owls which involved placing microelectrodes deep enough into the brain to obtain recordings from single neurons. Sounds were then presented to the bird's ears from different areas in space and the resulting neuron response was recorded.

Nerve impulses arriving to the main auditory center in the mid-brain have already been processed in the auditory pathway. Some neurons show highest level of response to sounds from certain areas in space whereas, others seem to respond to sounds from all directions and positions. These latter neurons are most likely responsible for the detection rather than location of sound.

Through these experiments Knudsen and Konishi were able to map the areas in the brain which perceive sounds from specific regions in space.

So, for the Barn Owl hearing is believing.

Predictive ecology:

by Cameron D. Eckert

If one were to ask what the prevailing problem is in Canadian lakes today, the answer would likely be acid rain. Through the process of lake acidification a lake becomes essentially sterile. In the mid sixties and early seventies our lakes were dying from a problem that existed on the opposite pole from acid rain. This phenomena is termed accelerated eutrophication.

Eutrophication is a natural process whereby a lake is transformed over time from one that is oligotrophic to one that is eutrophic. The characteristics of an oligotrophic lake are clear water with a low nutrient concentration and such desirable fish as Pickeral and Lake Trout.

A lake that has become eutrophic tends to be somewhat less than clear due to abundant algal colonies, with a high nutrient concentration and such undesirable fish as Crappy, Carp and Catfish. Due to the high organismal activity in a eutrophic lake the oxygen supply in the water can be depleted to the point where the lake is considered 'dead'. In the early seventies Lake Erie was dead and Lake Ontario was on its way. Clearly this was an ecological disaster on par with the problem of lake acidification today.

The prevailing attitude among students of ecology at the time was that all pollution must be halted in order to save the natural realm. This demand, however, is not realistic in a society that is based on consumption and the pro-

duction of waste. Politicians do not have ears for those kinds of words. What the politicians wanted were reasonable solutions to environmental problems such that ecology as a science was put to the test. The result? The answers were not coming.

In 1968 the situation changed somewhat. Richard Vollenweider is a Swiss Limnologist (lake biologist) who had come to Canada in the mid-sixties to study the problem of accelerated lake eutrophication. In 1968, Vollenweider published a paper entitled; *Scientific fundamentals of the eutrophication of lakes and flowing waters with particular*

reference to nitrogen and phosphorus as factors of eutrophication.

Phosphorous is a chemical that is abundant in human waste, fertilizer, and some detergents. Phosphorous is an effective fertilizer for plant growth hence excess loading of phosphorous in lakes results in accelerated eutrophication.

Vollenweider proposed a simple model that related the quantity of phosphorous to the degree of lake eutrophication, that is, the model predicted lake trophic status based on total phosphorous. Based on this

Science is built up with facts, as a house is with stones. But a collection of facts is no more a science, than a heap of stones is a house.

Jules Henri Poincaré
La Science et L'Hypothese (1903)

Our minds are infinite, and yet even in these circumstances of finitude we are surrounded by possibilities that are infinite, and the purpose of human life is to grasp as much as we can of that infinitude.

Dialogues of Alfred North Whitehead
June 28, 1941

Concern for man himself and his fate must always form the chief interest of all technical endeavours, concern for the great unsolved problems of the organization of labor and the distribution of goods — in order that the creations of our mind shall be a blessing and not a curse to mankind. Never forget this in the midst of your diagrams and equations.

Albert Einstein
Address, California Institute of Technology (1931)

Evolution vs.

Having read the various theories regarding the origin of life it can be distressing for those who have read the bible under a serious light. How can one view religion and evolution as being compatible. For those who are interested here is a brief hypothesis that may encompass the two alternative views regarding the creation of the human race.

The main conflict revolves around the hypothesized dates of creation and the method by which it was to have occurred. Religious scholars have determined that creation was to have taken

place some six thousand years ago. The present scientific view is that the origin of the earth occurred approximately 4.5 billion years ago. Further to this religious view sees God as the creator of mankind whereas the scientific view details a process through evolution driven by natural selection.

Certain theologians have interpreted the creation story in a very literal sense as referring to human physical creation. Is it not possible that some six thousand years ago there was a spiritual creation with the physical human already present through the evolutionary processes?

When brain chemicals go awry

by Danielle Ofri and Monica Vetter

When asked to name some of the most serious medical problems facing researchers today most people will list cancer, Alzheimer's disease, arthritis and heart failure. Few will mention mental illness, despite the fact that victims of schizophrenia and the affective disorders fill about 20% of all hospital beds occupied throughout the country.

A disease is defined as a malfunction of part of an organism. Malfunction can manifest itself in a number of ways: breathing difficulties, weakness, poor eyesight, low blood cell count.

Diseases of the brain result in both physical problems, such as loss of motor control, and disorders of intellect and/or personality. It has become clear in the last 30 years that many mental disorders have known physiological causes, properties and etiologies linked with brain malfunction.

Schizophrenia is one disease which seems to be poorly understood by many people. The term schizophrenia literally means 'a splitting of the mind', since the disease is characterized by a splitting of the cognitive sides of the personality from the emotional side. A schizophrenic might, for example, laugh while speaking of a particularly sad experience. This is quite different from multiple or split personalities, a rare disease in which the person alternately assumes two or more personalities.

In general diagnosis in psychiatry is much more difficult than in other branches of medicine since symptoms consisting of changes in behaviour, thought processes and subjective feelings can be very difficult to quantify and compare.

Schizophrenia has in the past proven particularly prone to misdiagnosis. Modern criteria of schizophrenia require that one or more of the following groups of symptoms be present:

1) Bizarre delusions (for example, of being persecuted or having one's feelings, thoughts, and actions con-



Personal Impressions of schizophrenia expressed by a patient during art therapy (Schizophrenia Bulletin, 1984)

trolled by an outside force).

2) Auditory hallucinations (for example, hearing voices commenting on one's actions).

3) A disorder of thought, consisting of incoherence, loss of the normal association between ideas, or marked poverty of speech accompanied by a loss of emotional responsiveness (flattening of affect) or less specific delusions and hallucinations.

Schizophrenia is probably more correctly viewed as a group of related disorders in which the above symptoms occur in different degrees. This notion is supported by the fact that some forms of schizophrenia respond very well to antipsychotic drugs while others do not.

Although the cause of schizophrenia is unknown, there is much evidence pointing to the fact that the disease is the result of biochemical imbalance or other physical changes in the brain.

First of all, it is clear that there is an important genetic component to schizophrenia (although it is by no means an entirely hereditary disorder). Approximately 1% of the population in almost every country of the world suffers from schizophrenia, regardless of differences in culture.

In addition, upon examining the incidence of schizophrenia among parents, children, and siblings of patients, the rates were 10-15% rather than 1% as seen in the population at large.

To control for environmental pressures within families with schizophrenic members, studies were conducted on twins adopted by different families. The chance for concurrence of schizophrenia in identical twins was 50%, while the chances dropped to about 10% for fraternal twins.

Although many earlier studies suggested that schizophrenia was a disorder caused largely by pathogenic psychosocial conditions, particularly within the family, genetic studies helped to show that this was not the case.

The biochemical nature of schizophrenic disorders was most con-

vincingly established. Prior to this time treatment for schizophrenic patients often consisted of therapy, frontotomies, or simply 'locked up'.

By the 1940s, however, desperate in the face of overcrowding, and occasional problems. The nursing home continued to treat patients for life.

In 1954 revolutionary psychiatric drugs known as antipsychotics were found to be effective in the treatment of schizophrenia.

Originally it was thought that these drugs were simply calming patients down. However, it was soon discovered that these drugs had a profound effect on the brain, particularly in the area of the dopamine system.

Other classes of drugs have been developed to ameliorate the symptoms of schizophrenia by blocking the action of dopamine in the brain.

Further evidence has shown that the development of schizophrenia is a complex process involving both genetic and environmental factors. The dopamine hypothesis of schizophrenia suggests that an imbalance in the dopamine system is a key factor in the development of the disorder.

Recent research has shown that the dopamine hypothesis is a oversimplified and that the response to treatment is highly variable.

the birth of a new science

ecologists were able to suggest reasonable limits for phosphorous output, which was something that the politicians could deal with.

Using Vollenweider's model and one developed, in 1975, by limnologists P. Dillon and Frank Rigler (of McGill University) the governments of Canada and the United States were able to effect controls on phosphorous output thus putting a check on eutrophication.

Vollenweider's 1968 paper has been hailed as one of the most successful experiments in twentieth century ecology. It has indeed become the cornerstone

creation

Human kind evolved as any other species from an original organism but then there was a change in the whole nature of our species — a force greater than our own deemed that the human species was suitable for a soul. Thus the human species was created, we were raised above the level of the rest of the beasts of the earth.

Thus, although we went through a physical evolution we were the fortunate recipients of a spiritual creation.

Believer or cynic, creationist or evolutionary biologist, the question remains open.

-C.D.E.-

ned in the 1950's. ere was no effective phrenia. Mentally ill eived electro-shock botomies or were

the situation was mental institutions; or living conditions, se were serious pro- of psychiatric pa- grow since these un- ere often committed

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has shown that the more complex than Some forms of ones which do not therapy, may have

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to a whole new approach to ecology.

One of the notable criteria for a theory in science is that one must be able to make predictions about the future state of a system based on that theory. Prior to 1968 the bulk of ecologists were concerned with developing explanatory theory. This type of theory attempts to make predictions but goes beyond this — it attempts to provide an explanation for the behaviour of the system under study.

Vollenweider's work can be termed as empirical theory, as its sole purpose is to predict the future state of the system without suggesting an explanation for the patterns observed in nature. This empirical theory may merely represent the correlation between two variables in a system, such as available sunlight and algal biomass.

What is it that makes this type of approach attractive to ecologists? Vollenweider was presented with an ecological problem and he was able to develop scientific tools for the management of enriched lakes, whereas traditional explanatory ecologists were not able to provide any solutions. It was the success of Vollenweider's approach and a general disappointment with traditional ecology that brought ecologists to predictive ecology. The predictive limnologist feels that contemporary problems require a different approach, one based on empiricism, with the goal of predicting salient properties of the whole lake.

The goals of predictive limnology suit a range of groups including academic limnologists, lake managers and lake users in general. The approach offers socially and biologically important predictions that can be tested in the real world.

There are certain fundamental characteristics of predictive limnology as an approach to scientific problems. Firstly the system attributes to be predicted are simple, operational and widely studied properties of the lake system. The predictions are based on the use of highly simplified models and regressions using few variables but based on large quantities of data.

This approach is appealing to those scientists who are willing to sacrifice precision and detail in description for application and generality of prediction. The result is not an all-encompassing theory describing the aquatic system but rather a large and diverse group of possibly independent, simple models and correlations.

Because the data used to develop the models are taken from studies across all lakes and may not involve experimental manipulation, then the net affect of all uncontrolled variables are seen in the residual scatter. Thus the models apply in the field since the uncontrolled-for effects are implicit in uncontrolled observations.

The regressions are tools for rapid estimation of aspects of the lake environment when good measurements are not available and a standard of comparisons when they are. General patterns in nature can be expressed concisely and quantitatively. Errors in prediction can direct the researcher to areas of the ecosystem where uncertainty is the greatest and further research is needed the most.

For the academic the relationships developed through regression are important as they can put their research into the ecological context of more measurements and variables than the individual could measure. For applied ecologists, the regressions release science to educated persons who need not be experts in the field. This is essential for environmental management and preservation. The baseline is that the predictive approach offers the advantages of general, quantitative theory.

There are those who object to the empirical approach to ecology claiming

that it tends to be imprecise. This problem is significant when one is concerned with an individual estimate but becomes less critical when average trends are sought. This objection to predictive ecology is effective in outlining one of the future goals of the science, that is, the reduction of uncertainty through further research.

To overcome the degree of uncertainty that exists today these scientists must strive to replace current relations with similar models. Those future models should be based on variables that are easier to measure, less uncertain and therefore more effective as predictors.

Predictive power may also be improved by better describing the range in which the present models are effective. Finally, as predictive ecologists become better mathematicians more sophisticated models will replace the simple ones used today.

Is predictive ecology here to stay? I'm not sure that the relationship to make that prediction has been developed yet.

Author's note: The information for the bulk of this article was provided by McGill Limnologist, Robert H. Peters and literature by the late Frank Rigler who was chairman of the McGill biology department from the years 1976 to 1981.

It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around

us.
Charles Robert Darwin
The Origin of the Species (1859)

To doubt everything or to believe everything are two equally convenient solutions; both dispense with the necessity of reflection.
Jules Henri Poincaré
La Science et L'Hypothese (1903)

There exist in heaven and earth more things than appear in present day scientific philosophies. To acknowledge ignorance of these important matters is, in my opinion, not a retreat from reason but instead the most constructive way to broaden and deepen the scientific approach to the understanding of life.
Dubos (1961)

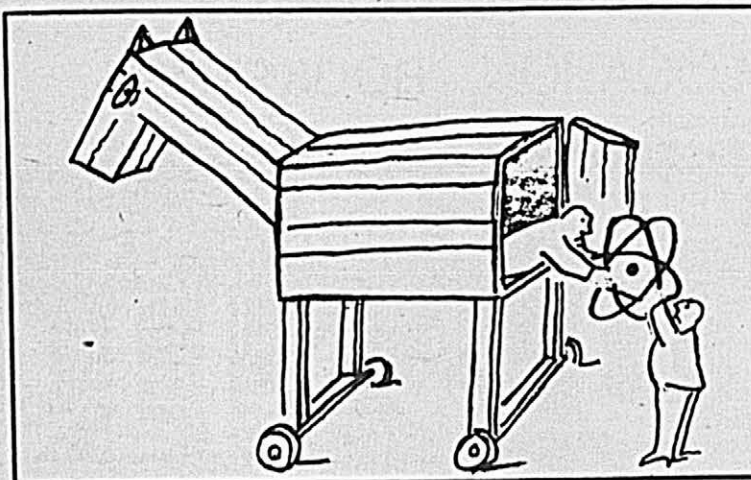
France radiates nuclear capability

by Jason Creaghan

Sometime later this year France will explode a nuclear device in the South Pacific islands of Mururoa, continuing what has been one of the most aggressive nuclear policies of the 'club' (U.S.A., U.S.S.R., France, England, China)

Since 1973 le Centre d'Experimentation du Pacifique in the French Polynesians (pop. 155,000) has been the site of 77 underground tests. During the same period the U.S. exploded 314 nuclear devices and the U.S.S.R. 390.

The recent sinking of the Greenpeace ship Rainbow Warrior by French agents comes at a time of continuing confrontation between testing countries and pacific islander groups opposed to tests in the area. However, most of the attention, in France and elsewhere, has been focussed on the Rainbow Warrior scandal and not on the questions of nuclear



testing, using a colony for it and nuclear proliferation.

France became a nuclear power in 1960. Under DeGaulle it began a massive effort to become independent

in the areas of nuclear weapons, atomic energy and technology. Soon after the French nuclear industry had established itself domestically it followed a similar course to that taken by many countries

like West Germany, U.S.A. and Canada, who began to export the technology overseas to pay for their nuclear industries. This trend has contributed greatly to current levels of nuclear proliferation.

The developing nations that trade in nuclear technology, like France and Canada must acknowledge the inevitability of nuclear proliferation despite efforts to control it. In 1963 the Limited Test Ban Treaty came into effect, banning nuclear tests in the atmosphere, space and sea. However, underground tests, like those of the French in the Mururoa islands continue to contribute to the already extensive variety of nuclear weapons.

In 1963 the main obstacle to a total ban on all testing was a reliable verification system for underground tests. Today the technical problems have been worked out. The problems that remain are political.

To live alone, one must be either a
god, or an animal.
F.W. Nietzsche

the McGillDaily

75th year of publication

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The Daily is a founding member of Canadian University Press (CUP), La Presse Étudiante du Québec (PEQ), and Campus Plus (CUP Media services).

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BACK THE FUTURE

BACK THE LIBERATION
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UN BÉNÉFICE CONTRE
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PLUS MANY MORE...

WEDNESDAY,
OCTOBER 2, 8PM

BALLROOM, MCGILL UNIVERSITY
STUDENT CENTRE

3480 MCTAVISH
INFO: 272-8153

\$8.50 ADMISSION
\$5.00 (STUDENTS, UNEMPLOYED,
SENIORS)

THESE LES ÉTUDIANTS DU CENTRE, NEW SOCIÉTÉ
PARTY OF QUEBEC, SOUTH AFRICAN BLACK WOMEN'S
COLLECTIVE, ASSOCIATION AUTONOME DES JEUNES AFRICA
THE MONTREAL MIRROR, THE MCGILL DAILY, THE CONCORDIA
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BLACK WOMEN'S UNION, QUEBEC AFRICAN COMMUNITY,
MIGRA EMPLOYEES FOR RACIAL DISCRIMINATION, FOLKS FOR
PEACE, CONCERNING WOMEN'S COLLECTIVE, BEANPOTS.

DANCE, DRINK, DIVEST...!

The McGill Daily is sponsoring BACK THE FUTURE, the best bash the Ballroom has ever seen. This Wednesday, Theatre Smeatre will present an Anti-Apartheid Benefit with proceeds for the South African liberation movement.

...more schizophrenia

continued from page 4
other causes. Diffuse atrophy of the cortex has been demonstrated in some of these patients.

There is a long way to go before this disease is completely understood and properly treated. The current method of drug therapy is far from ideal since many of the drugs used have serious long term side-effects.

Despite the fact that schizophrenia has been clearly established as an organic disorder a definite social stigma has followed the disease through history right up to the present. Madness is one of the most difficult conditions to comprehend or sympathize with. However, people must begin to realize that sufferers of schizophrenia need support and sympathy like patients of all the other major diseases.

1,2,3,4, Don't
let the
disarmament
issue be a bore
— come to the
8 pm meeting
on Thursday;
or vaporize

WHAT'S HAPPENING AT HILLEL?

STANLEY STREET

CINEMA

Night Fog
(Alain Resnais)

An eloquent film that evokes the horror of Nazi concentration camps and documents the philosophy that led to their construction.

Battleship Potemkin
(Sergei Eisenstein)

The dramatic re-enactment of mutiny on a Russian battleship in 1905.
Screenings Wed. Oct. 2
2 p.m. & 5 p.m. at
3460 Stanley St.

AIDS HYSTERIA

How much do you really know?

Dr. Tsoukas, Assistant Professor of Medicine at McGill University, member of the World Hemophilia Foundation and presently serving on the A.I.D.S. advisory committee, will be lecturing on the AIDS controversy. This important topic concerns everybody, so make every effort to attend.

Thursday, Oct. 3, 2 p.m.
For more information
call Heidi at 845-9171

TASK FORCE FOR ETHIOPIAN JEWRY

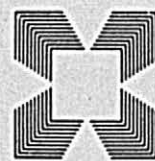
A Party and Meeting with three students who recently returned from Israel, where they worked with Ethiopian Jews who survived Sudanese refugee camps.
Thursday, Oct. 3, 7 p.m.
For more information
call Mark at 845-9171

Daily Staff Meeting tomorrow at 5 pm, and if you don't show we'll hold our breath until we turn purple.

American Thanksgiving Nov. 28th FLYING HOME?

Discount fares to
U.S. destinations—
Have limited space!
FLY DELTA/EASTERN etc.

RESERVE
TODAY



TRAVEL
CUTS
Going
Your Way!

Student Union Building—849-9201

MCGILL UNIVERSITY

LEATHER JACKET DAY

DATE: Thurs Oct 3

TIME: 10am to 4pm

LOCATION: BOOKSTORE

PRICE: \$199.95

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THURSDAY, OCTOBER 3, 8 P.M.

PUB NIGHT

IN THE UNION BALLROOM

Ads may be placed through the Daily, Room 803, Student Union Building, 9 a.m. to 3 p.m. Deadline is 2:00 p.m. two weekdays prior to publication.

McGill students: \$2.50 per day; for 3 consecutive days, \$2.00 per day; more than 3 days, \$1.75 per day. McGill faculty and staff: \$3.50 per day. All others: \$4.00 per day. *Exact change only, please.*

The Daily assumes no financial responsibility for errors, or damage due to errors. Ad will re-appear free of charge upon request if information is incorrect due to our error.

The Daily reserves the right not to print a classified ad.

341 — APTS., ROOMS, HOUSING

2 1/2 furnished apartment, St. Marc and Ste. Catherine, to sublet, starting 1st October. Very near Guy Metro. Rent \$350 including utilities, negotiable. Phone: 989-2056

1 1/2 to rent 3558 Lorne Ave. 30 seconds from campus. Clean, sunny, freshly painted. \$270/month (heating and water tax included) call 849-8241, 287-1283 or 287-9474.

Available immediately 4 1/2 to share with responsible, mature student, Atwater Metro, newly renovated, non-smokers only, clean, quiet. \$220/mo. includes heat, Shelly 937-8733.

St. Adolphe D'Howard Chalet 5 bedrooms, 3 bathrooms, sauna, stone fireplace, near ski hills, unheated, Nov. 1-April 30. \$875/monthly. 843-8798 evenings; 392-8825, 392-8844 day. References, Professor Francoeur.

Sublet 3 1/2. \$135 near Metro. Fridge, stove, unheated. Available Now. Quiet, responsible graduate preferred; references. 7-11 pm. 731-5271

Country house for sale in Ste. Agnès de Dundee. Tranquil, secluded, 60 miles SW of Montréal, on the US border. 4 bedrooms, \$35,500. 465-9410/264-2539

Sublet until Christmas, large, furnished apt. T.V., stereo, cushy, ideal for couple. Reasonable. call: 277-8970.

URGENT 6 1/2 on Durocher to share with serious female student non-smoking. \$208/month. Available NOW. Lucy at 845-0819 morning or evening.

343 — MOVERS

Moving? All local moves done quickly and carefully by student with large closed truck. Fully equipped, reasonable rates. Call Stéphane — 288-8005.

Special moving rates for people without much to move and who help move themselves. Déménagements économiques si vous n'avez trop de bagages. Call John 844-6214.

354 — TYPING SERVICES

Theses, term papers, resumes. 18 years experience. Rapid service. 7 days a week. \$1.50 / double spaced. IBM (2 minutes from McGill Campus) Mrs. Paulette Vigneault: 288-9638, 288-0016.

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356 — SERVICES OFFERED

Research papers! 306-page catalog... 15,278 topics! Rush \$2.00 — Research, 11322 Idaho, N° 206MB, Los Angeles 90025 (213) 477-8226.

Public writer and translator English, French, Spanish. Writing or letters, resumes, varied texts fast and confidential. Call before 8 p.m. 849-9708.

Guaranteed higher grades, guarantee you'll pass every course through unlimited hypnosis and flotation or money refunded. Call Mrs. Miriam Praw or Dr. N. Schiff 935-7755. 1538 Sherbrooke West, Room 710. Why wait, do it now.

MONEY — 24 hr. banking machine now on campus. Sign up now at the National bank booth, lobby of Union Building.

Roses are red... Tell your loved ones just how much they mean to you: with a personalized poem! Call Mark: 286-0800. Reasonable rates.

Resumes Registered: student discount. Expert job-targeted point system, text arrangement. IBM word processing. Justified margins, proportional spacing. Experienced: Tutoring, student paper advisement, editing, typing. 488-5694

Career counselling: Lorne Prupas, M.A. (Counselling and Educational Psychology) is available to you in your career search. 481-0972. Evening appointments. Fees on a sliding scale.

Word processing: professional service specializing in theses, reports, etc. Student and rush rates available. Letter-quality printer. Near McGill. Printing and graphics available too. 934-1455.

361 — ARTICLES FOR SALE

Bookshelves, desk, computer or stereo tables, other articles in wood, new, also Partitions (screens) three or more panels. Mike 526-0034

Antiques for sale: oak dresser (4'x2 1/2'x4'), oak double bed (5 1/2' headboard), bookshelf with two drawers at bottom, two glass doors (5'x14"x3"). \$1200 would let go for \$800. Call François after 7 pm at 286-1962

Boardsailors!! Must sell. "SAINVAL" competition model. Sleek, fast, ideal for up to 150 lbs. Very good condition. Asking \$500 firm. Call Monica during regular business hours at 735-1168.

Honda 90cc; dual purpose, automatic clutch; very low mileage; good condition; price negotiable. Call Pat 337-9689 (after 7pm on weekdays).

The typewriter you've been looking for. Smith Corona 2200, in excellent condition. Guaranteed for 30 days — \$200. Consistently types A+ term papers. 935-5694. A.M. before 11:30, or late P.M.

Executive, electric typewriter, I.B.M., good condition must be sold before Friday.

Special \$150.00, call 328-1085

"10,000 different movie & movie star posters. Catalogue \$2.00. MNEMONICS LTD. Dept. "H" N° 9, 3600 21 St. N.E., Calgary, Alta. T2E 6V6.

Beautiful Icelandic Sweater, brown, gray and off-white. Women's size M-L; various other clothes (e.g. Benetton, Esprit). All like new. Phone 935-0858 after 6 pm.

367 — CARS FOR SALE

1975 Chev Malibu, automatic, power brakes, power steering, well maintained, good bodywork, \$600. Call 392-4720, 9 am-5pm

372 — LOST & FOUND

Found. 2 silver-toned Dominion-Lock keys on Lower Campus football field, last Thursday. Come to Student Society front desk.

374 — PERSONAL

Looking to fill a void? Join the Daily... experience life without windows!

Caroline Schlesinger!! Where are you? If you read this, contact Heather at 487-9471. I miss you!

Creative black and white photography. Portraits of grandmas, girlfriends, boyfriends. Publicity photos for actors, musicians, etc. Teddy-bear superimpositions available. For references or more information please call Owen at 488-1727 (evenings).

Not Those kinds of cat or goat photos. O.E. Elaine, you've really got a hold on me. Hoping to get to know you better. XOXO Andrew.

Want to know what films are showing? Ask us—McGill Nightline: 392-8234

383 — LESSONS OFFERED

OESTERREICHER GIBT DEUTSCHSTUNDEN FUER ALLE STUFEN—German lessons for all levels. Call 935-3650 Wolfgang.

French classes: Individuals and/or groups. Conversation, grammar, composition, translation. Tutorials if needed. Very qualified teacher. 20 years university experience. Reasonable rates. Call 737-8373

French tutoring by experienced teacher — 5 min from Campus. Before 8 p.m.: 849-9708, try weekends too.

Classical Guitar lessons offered by experienced teacher. All ages and levels. First lesson Free. Ross MacIver 481-4952

385 — NOTICES

"I'm sure I'll be a complete wreck by exam time!" Sound familiar? TEST ANXIETY GROUP now forming McGill Counselling Service. Phone now: 392-5119.

ENGLISH MAJORS!! You are invited to attend the Dep't of English Students Assn. Welcome Back PARTY. Held on Wed. Oct. 2 from 4-9 pm in S.U. B09/B10. Refreshments will be served!!! I.E.!!

YWCA group against pornography will be on campus this term with a petition regarding Montréal's current bylaws on the display of pornography. YWCA, 1355 Dorchester W. 866-9941.

Choir of the faculty of Religious Studies needs singers, Wednesdays at 4 o'clock at the chapel. Come, it's a great experience! Information: Andrée Dagenais: 525-4613

FINALLY! Money at your disposal. The National Bank's banking machine opens Oct 15th. Accounts available in lobby of Union Bldg before Oct 4th.

387 — VOLUNTEERS

Do you want to see your name in print? Why not have your name immortalized in the pages of the Daily. Impress your friends, parents, and the new civilian security service. Join the McGill Daily and experience journalism without anaesthesia. Drop in at Union B-03 anytime. Entering our 75th year of publication — a tradition worth keeping.

Montreal Neurological Hospital. If you would like to be involved in the McGill Student Volunteer Programme, you must sign up by Sunday, October 6. For more information, phone John Hale, 288-0463.

389 — MUSICIANS WANTED

Three lines urgently seeks male or female vocalist for the recording and performing of original dance-oriented electronic music. Contact Duncan at VOT Records, 457-3691; or Steve, 697-4895.

Wanted: Drummer: Beats Needed: Boomch! Boomch! Sssstish, Sssstish, dugga dugga. We got band. We got drums. We need you. Contact: Jamie + Cam 3580 Lorne N° 304.

Carbon Copy Dept.

McGill Association of Continuing Education Students
995 Boulevard Station
Montréal P.Q. H3E 2E1

September 25, 1985.

Mr. James Green,
President,
Students' Society of
McGill University,
3480 McTavish St.,
Montréal P.Q. H3A 1S9

Dear Sirs:

I wish to congratulate you on your performance at our first meeting of the new season. You did an admirable job of selling your attempts to take us over.

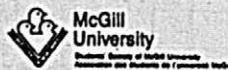
As I mentioned to you in my rebuttal, I was slightly worried about my ability to take notes during a lecture or conversation since my notes of our conversation of September 18th did seem to be so substantially different from what you told our members. I was considerably reassured when I read today's French edition of the Daily. Your Vice-President confirmed that, in fact, there is a new constitution and it is going to be presented to a referendum in January.

I had thought I had made myself quite clear during our meeting. I had asked you to suspend any further offers of services to us until I could secure a legal opinion on what effect, if any, accepting your various offers would have on our independent status. It seems that fifteen minutes later you invited members of my executive to participate in your Leadership Seminar the following day.

Enclosed you will find a cheque for eighteen dollars. From your publicity on the event I gather that that is the full Students' Society cost of the one member of my organization who did attend. I would appreciate it if, in future, you have any other offers to extend to our members, you have the courtesy to inform me first. I remain,

Yours truly,

Harvey Litvack,
President.



October 1, 1985

Dr. Harvey Litvack
President,
McGill Association of
Continuing Education Students
995 Boulevard Station
Montréal, Québec
H3E 2E1

Dear Harvey:

I can see that you still fail to understand the Students' Society's goals. We do not want to have any control whatsoever over NACES and certainly we do not want to "take you over" as you suggest in your letter of September 25th.

I shall now put in writing that which I have been trying to communicate to you verbally, but without much success. The goals of the Students' Society are to promote the welfare and interests of all students in the University and students registered in the Centre for Continuing Education are not accepted. If the only way to pacify you is for Students' Society to cease offering its services to the members of NACES, that is a very simple thing to do. However, before we do anything as rash as that, I would like to see a motion issued by your council assuring me that should I withdraw any assistance to NACES, it is at the express wish of NACES and will not reflect poorly on the Students' Society.

I apologize for helping your executive improve their leadership skills by inviting them to attend our leadership conference and trust that any other offers made to NACES will be treated in the positive light in which they were made.

Sincerely,

James Green
President

P.S. There was no cheque enclosed with your letter.

cc: The McGill Daily

3480 rue McTavish Street, Montréal, Québec H3A 1S9 (514) 382-8822

WEST POINT CONFERENCE U.S. FOREIGN POLICY (West Point N.Y.—Nov: 20-23, 1985) APPLICATIONS INVITED

McGill has been invited to send 2 delegates. Applicants should preferably be U-3 students with some knowledge of international politics, U.S. foreign policy or particular regions/issue areas. Some academic background in these areas is desirable. Academic performance will be an important component in the choice. Interested students can obtain application forms from
Prof. Michael Brecher Dept. of Political Science
Rm 528 Leacock Building (392-5230)
DEADLINE Wednesday, Oct. 9, 1985

with all the best hits...

LIVE AT GERT'S
...from the '50's and '60's

**BLACK
CADILLAC**

Thursday, Oct. 3

9 p.m.

FREE ADMISSION

D.J. by Thurs, Fri and Sat. nights



events

Today

Test Anxiety Group now forming at the McGill Counselling Service. Six weekly sessions to help you relax and concentrate on exams. Phone 392-5119.

McGill Student Pugwash a lecture by Dr Dawson Schultz, Medical Ethicist, Montréal Children's Hospital. 19h30 Lea 219. Info.: 934-4743.

McGill Women's Varsity Hockey Team tryouts for team — wear shorts & running shoes. Monday and Wednesdays at 18h00, Fridays at 17h00. At Arthur Currie Memorial Gym outside the women's locker room. Info.: 252-3085.

Thursday

McGill School of Social Work film series, Killing us Softly: Images of Women in Advertising Wilson Hall Rm 110, 13h00-14h00.

Detour Tonight McGill's Residence every Thursday night. Beer only 1 buck. Brown Cow and Shandy specials. Top of University. An Inter-residence Council event

Network Alternatives Hyde park — free forum for debate and discussion. 13h30 weather permitting, outside Redpath Hall. Info.: 392-8976.

PC McGill meeting, discussion of P.C.'s first year in government. Guest speaker. 18h00, Union 425.

P.C. McGill réunion discussion de la première année du gouvernement P.C., conférence invitée. Tous bienvenus! 18h00, Union 425.

Yoga as Process with Uma Cotten 10h00-11h30 at the Yellow Door, 3625 Aylmer, 392-6742. Free, sponsored by Student Christian Movement.

McGill Student Pugwash A lecture by Dr. Dawson Schultz, Medical Ethicist, Montréal Children's Hospital. 19h30, Lea 219. Info.: 934-4743.

Women, Faith, & Freedom lunch-time discussions (bring your own lunch) 12h00-13h00 at the Yellow Door. This week's talk: Learned Women and the Medieval University.

McGill Film Society presents Top Hat 20h00, FDA Auditorium, \$2.00.

McGill Project Ploughshares and Concordia QPIRG slide show Militarization: an obstacle to development with Reverend Chris Ferguson speaking on Central America. 12h00, Union B09-B10.

Armenian Students' Association weekly get together and office hours. 15h00-17h00, Union 402. Info.: 286-0684.

HELP OTHERS SURVIVE!

with the

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Drive

Oct. 7-11

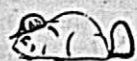
...make a difference



NEXT WEEK—UNION BALLROOM
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FOR VOLUNTEERING, LEAVE
MESSAGE
AT THE STUDENTS' SOCIETY
OFFICE

GO WITH THE

BEAVER



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256K RAM, monochrome screen,
graphics and more..... \$1995.00

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EPSON LX-80.....\$375.00
FX-85.....\$575.00
FX-185.....\$915.00
DX-10.....\$400.00
DX-20.....\$550.00
GEMINI SG-10.....\$380.00

BASF Diskettes:

SS, DD 25 for.....\$28.00
DS, DD 25 for.....\$34.00
DS, DD 10 for.....\$17.00

Memory Chips:

128K for.....\$20.00

and much much more...

COOP MCGILL is owned and operated by students,
and located in McDonald Engineering Bldg. Room
278 (Iron Ring Room). Open weekdays 10 a.m.-4 p.m.

SEE...WE GOT 'PIGBOY' IN THE FIRST ISSUE AFTER THE REGIONAL

Attention

All Graduate and potential Graduate Students:

FUNDING WORKSHOP

Representation from NSERC, SSHRC & MRC
Thomson House, Wednesday, Oct. 2, 7:00 p.m.

Open for everyone for this special event.

Colloque conjoint des
facultés de droit de
l'Université de Montréal et
de l'Université Jean-Moulin
(Lyon III)

Hôtel Ritz-Carlton
Montréal
3 et 4 octobre 1985

Le Québec et les Communautés européennes

Jeudi 3 octobre 1985

14h00 Ouverture du Colloque
Allocution d'ouverture
Monsieur Panayotis SOLDATOS
Professeur, Département de science
politique
Université de Montréal

15h00 Première séance de travail
Le cadre historique et juridique des
relations Québec-Communautés
européennes

Conférenciers:

Monsieur Christian PHILIP
Directeur - Centre de documentation
et de recherche européennes -
professeur à la Faculté de droit de
l'Université Jean Moulin (Lyon III)
Présentation générale de l'Accord-
cadre Canada-Communautés
européennes, en particulier dans
une optique communautaire

Monsieur Randolph GHERSON
Directeur général des relations avec
les pays européens du sommet et de
la Communauté européenne -
Ministère des Affaires extérieures,
Ottawa
La politique extérieure fédérale et
les Communautés européennes

Monsieur Luc BERGERON
Conseiller - Direction de la
coordination sectorielle - Ministère
des Relations internationales du
Québec
La participation du Québec aux
relations Canada-Communautés
européennes et les aspects
historiques et juridiques des
relations Québec-Communautés
européennes.

Madame Edelgard MAHANT
Professeure - Département de
science politique - Université
Laurentienne
Institutional Aspects of Canada -
European Communities Relations
since the Framework Agreement

Monsieur Jean-Claude BARRETTE
Directeur des organisations
internationales - Ministère des
relations internationales du Québec
La mise en œuvre de l'Accord-
cadre Canada-Communautés
européennes: perspectives
québécoises

12h00 Déjeuner-causerie
Salon Gris

Conférencier:
Monsieur Jean TARDIF
Délégué général du Québec à
Bruxelles
L'intérêt du Québec pour les
Communautés européennes

14h00 Troisième séance de travail
Bilan et perspectives des relations
Québec-Communautés européennes

Conférenciers/Conférenciers:
Monsieur Louis REBOUD
Directeur - Centre universitaire de
recherche européenne et
internationale - Professeur à
l'Université des sciences sociales de
Grenoble III
Le bilan économique des relations
Québec-Communautés
européennes

Monsieur Gérard AUDET
Directeur - Direction études et
analyses - Ministère du Commerce
extérieur du Québec
Le bilan commercial des relations
Québec-Communautés
européennes (point de vue
québécois)

Madame Hélène DESLAURIERS
Membre du Barreau de Montréal -
Laurier, Brown de Grandpré,
Bruxelles
Le bilan des problèmes juridiques
rencontrés par les investisseurs
québécois dans les pays de la
Communauté européenne

20h00 Banquet final
Allocution de clôture
Bernard LANDRY
Ministre des Relations internationales
et du Commerce extérieur du Québec

Renseignements
Société québécoise de droit international
Faculté de droit
Université de Montréal
C.P. 6201, succursale A
Montréal H3C 3T1
Téléphone: (514) 343-6943
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Coût
Membres S.O.D.I. 10\$
Non-membre S.O.D.I. 20\$
Étudiant(e) membre 5\$
Étudiant(e) non-membre 10\$
Déjeuner-causerie 15\$
Banquet final 20\$



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